



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/539,831	02/28/2006	Partho Sarkar	10008.0100	1145
39602 7590 07/12/2010 THE NOBLITT GROUP, PLLC 4800 NORTH SCOTTSDALE ROAD SUITE 6000 SCOTTSDALE, AZ 85251				
EXAMINER				
ECHELMMEYER, ALIX ELIZABETH				
ART UNIT		PAPER NUMBER		
1795				
MAIL DATE		DELIVERY MODE		
07/12/2010		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/539,831

Applicant(s)

SARKAR ET AL.

Examiner

Alix Elizabeth Echelmeyer

Art Unit

1795

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 June 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-18, 20-22, 24-26, 29, 30 and 33-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 26, 29 and 33-37 is/are allowed.
- 6) ☒ Claim(s) 2-18, 20-22, 24, 25 and 38-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This Office Action is in response to the amendments and request for reconsideration filed June 25, 2010. Claim 18 is amended. Claims 38-43 are added. Claims 2-18, 20-22, 24-26, 29, 30, and 33-43 are pending. Claims 26, 29, 30, and 33-37 are allowed. Claims 2-18, 20-22, 24, 25, and 38-43 are rejected for the reasons given below.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 2, 5, 9, 10, 13, 14, 38, and 43 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Shimozu (JP 02-075167) in view of Khandkar et al. (US 5,712,055)

Shimozu teaches a series of concentric solid oxide fuel cells, wherein the air and fuel paths are arranged between every other cell, such that the inner electrode of the inner fuel cell, the outer electrode of the middle fuel cell, and the inner electrode of the third fuel cell are cathodes.

Shimozu fails to teach that the electrolyte layer of at least one of the fuel cells has a different composition and different optimal operating temperature than another electrolyte layer in the stack.

Khandkar et al. teach a series of solid oxide fuel cell stacks, where the electrolyte in each stack is different from the other stacks (abstract). Khandkar et al. and Shimozu are analogous because, though Khandkar et al. do not teach concentric cells as in Shimozu, both deal with solid oxide fuel cells arranged in a series.

Khandkar et al. further teach that the electrolyte composition is selected based on the operating temperature of the fuel cell, allowing for an increase in the output of the fuel cell system without compromising fuel utilization (abstract; column 3 lines 3-5).

It would have been obvious to the skilled artisan at the time the invention was made to select an electrolyte material for the fuel cells of Shimozu that would optimize output of the fuel cell system without compromising fuel utilization, such as taught by Khandkar et al.

With regard to claims 10, 14, the skilled artisan would have been motivated to optimize fuel cell performance, as is discussed above, and it would be within the ordinary level of skill in the art to determine the best electrolyte for the application, such as having two stacks with the same electrolyte.

As for claim 43, the skilled artisan will easily recognize that the inner fuel cell of Shimozu would operate at the highest temperature, since it is surrounded by fuel cells,

which produce heat. Khandkar et al. teach that an electrolyte for a higher temperature fuel cell should be different than the electrolyte for a lower temperature fuel cell (abstract; Figure 1).

4. Claims 3, 4, 6-8, 11, 12, 15-17, and 39-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimozu in view of Khandkar et al. as applied to claims 2 and 5 above, and further in view of Cochran et al. (US 2004/0072054).

The teachings of Shimozu and Khandkar et al. as discussed above are incorporated herein.

Shimozu and Khandkar et al. teach that electrolyte material correlates to operating temperature, but fail to teach the specifically claimed electrolyte materials.

Cochran et al. teach a solid oxide fuel cell having as electrolyte yttrium stabilized zirconia, scandium stabilized zirconia, and gadolinium-doped cerium oxide ([0045]).

One having ordinary skill in the art at the time the invention was made could have substituted one or all of the known solid electrolyte materials from Cochran et al. in the fuel cells of Shimozu and Khandkar et al. based on the properties of the materials and the results of the substitution would have been predictable. MPEP 2141 III.

Furthermore, it has been held that selection of a known material based on its suitability for its intended use, such as its operating temperature, is obvious. MPEP 2144.07

5. Claims 18, 20-22, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimozu in view of Khandkar et al., Hatano et al. (US 2002-0177026) and Du et al. (US 2004/0258972).

The teachings of Shimozu and Khandkar et al. as discussed above as discussed above are incorporated herein.

Shimozu in view of Khandkar et al. teach the claimed solid electrolyte fuel cell system as discussed above with respect to claims 1 and 5.

Shimozu teaches a base board on which the concentric tubular fuel cells are arranged (abstract).

Shimozu fails to teach the material from which the base board is made.

Hatano et al. teach a metal foam base plate for use with solid oxide fuel cells ([0029]).

Hatano et al. further teach a nickel chrome metal backing sheet, which the skilled artisan would recognize to be oxidation resistant ([0057]).

Hatano et al. teach the electrode laminated to the base foamed-metal structure ([0029]).

The plate of Hatano et al. is desirable since it offers high gas-shielding and energy density at low manufacturing costs ([0006]).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the plate of Hatano et al. in the system of Shimozu in view of Khandkar et al. since the plate of Hatano et al. offers high gas-shielding and energy density at low manufacturing costs.

Shimozu in view of Khandkar et al. and Hatano et al. fail to teach that the solid oxide fuel cells are electrically interconnected to the support plate.

Du et al. teach a metal support plate for electrochemical cell stacks, wherein the stacks are electrically interconnected through the plate, which allows the stacks to be connected to a load ([0032], [0035]).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to electrically connect the cells Shimozu Khandkar et al. and to the porous metal foam matrix sheet of Hatano et al. such as suggested in Du et al. since such connection would allow for the cells to be connected to a load.

Allowable Subject Matter

6. Claims 26, 29, 30, and 33-37 are allowed.
7. The following is an examiner's statement of reasons for allowance: the prior art does not teach or fairly suggest the claimed subject matter. Applicant has argued convincingly in the Remarks filed January 4, 2010 that Browall et al. does not teach providing a plurality of combustible cores side-by-side. Furthermore, the examiner has not found any other art to support a rejection of this limitation. The examiner finds that the closest art, Sarkar et al. (US 7,452,622) does not qualify as prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

8. Claims 3, 4, 11, 12, and 15-17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter: the prior art does not teach or fairly suggest the claimed combinations of electrolyte materials. While it is obvious, as discussed above, to select different materials based on those taught in the prior art, the examiner finds that it is not obvious to use the electrolytes as claimed in the configuration as claimed without further motivation that is not found in the prior art.

Response to Arguments

10. Applicant's arguments with respect to the pending claims have been considered but are moot in view of the new grounds of rejection, see above.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Janousek et al. (US 2002/0182468) teach the selection of different oxide ceramic electrolytes depending on the working temperature of the cell ([0003]).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is (571)272-1101. The examiner can normally be reached on Mon-Fri 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795

Alix Elizabeth Echelmeyer
Examiner
Art Unit 1795

aee